

## **12138160 SULTAN RIVER BELOW POWERPLANT, NEAR SULTAN, WA**

Puget Sound Basin  
Skykomish Subbasin

LOCATION.--Lat 47°54'27", long 121°48'51" referenced to North American Datum of 1927, in SW ¼ SW ¼ sec.17, T.28 N., R.8 E., Snohomish County, WA, Hydrologic Unit 17110009, on left bank, just downstream from Henry M. Jackson powerplant, 3.2 mi north of Sultan, and at mile 4.5.

DRAINAGE AREA.--94.2 mi<sup>2</sup>.

### **SURFACE-WATER RECORDS**

PERIOD OF RECORD.--October 1983 to current year.

GAGE.--Water-stage recorder. Datum of gage is 267.0 ft above NGVD of 1929 (levels by Snohomish County Public Utility District). Prior to Oct. 1, 1991, at site on right bank, 100 ft downstream at same datum.

REMARKS.--No estimated daily discharges. Records good. Flow regulated at Spada Lake (station 12137300) since April 5, 1965. Since May 1984, water is diverted from Spada Lake through a 14 ft diameter, 4 mile long tunnel and a 10 ft diameter, 4 mi long pipeline for power production and returned to the river upstream from the station, at the powerplant. Since July 1984, an undetermined flow has been returned to river at upstream diversion dam by pipeline from Lake Chaplain for instream flow requirement. Some flows diverted into Lake Chaplain from municipal use by City of Everett. U.S. Geological survey satellite telemeter at station.

AVERAGE DISCHARGE FOR PERIOD OF RECORD.--25 years (water years 1984-2008), 742 ft<sup>3</sup>/s, 537,800 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,300 ft<sup>3</sup>/s, Nov. 24, 1990, gage height, 15.03 ft, from rating curve extended above 4,500 ft<sup>3</sup>/s; minimum daily discharge, 157 ft<sup>3</sup>/s, Aug. 24, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,950 ft<sup>3</sup>/s, Dec. 3, gage height, 8.49 ft; minimum daily discharge, 317 ft<sup>3</sup>/s, Oct. 6.

## 12138160 SULTAN RIVER BELOW POWERPLANT, NEAR SULTAN, WA—Continued

**DISCHARGE, CUBIC FEET PER SECOND**  
**WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008**  
**DAILY MEAN VALUES**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	345	996	980	1,080	445	469	1,290	499	1,640	1,430	857	1,290
2	403	568	1,100	1,070	447	460	1,430	487	1,640	1,460	712	1,270
3	387	424	2,310	1,090	439	440	1,110	481	1,660	1,510	674	1,250
4	352	425	1,880	1,130	656	479	638	481	1,730	1,520	768	988
5	327	400	1,570	1,130	786	460	485	728	1,680	1,480	1,000	561
6	317	386	1,550	1,100	863	445	482	808	1,720	1,350	1,070	394
7	327	387	1,500	914	925	439	518	601	1,730	1,200	1,020	393
8	357	387	1,470	762	811	509	830	440	1,700	1,060	824	395
9	348	400	1,460	767	940	446	901	425	1,680	1,060	672	562
10	353	415	1,470	774	764	438	726	402	1,720	1,050	673	740
11	388	413	1,470	780	1,120	461	542	472	1,750	912	948	711
12	366	422	1,470	582	1,610	472	494	448	1,730	801	1,050	634
13	356	536	1,270	560	1,710	454	499	429	1,780	801	1,010	615
14	351	578	954	562	1,630	589	810	560	1,830	802	999	487
15	347	576	775	567	1,410	649	946	529	1,810	634	854	370
16	329	846	767	595	1,240	639	874	481	1,720	464	767	372
17	322	884	783	545	1,220	639	589	469	1,550	464	766	377
18	326	983	803	525	1,210	631	478	681	1,320	462	767	373
19	465	1,100	836	532	1,060	625	482	1,440	1,060	464	773	330
20	913	1,170	886	536	723	617	484	1,740	1,080	464	783	371
21	1,340	1,020	698	521	475	607	777	1,790	1,080	574	795	385
22	1,530	1,010	544	727	455	600	916	1,780	970	626	812	394
23	1,330	1,010	812	839	454	610	913	1,730	1,060	626	805	394
24	1,130	1,010	1,160	834	449	617	786	1,600	1,470	628	806	397
25	1,000	1,000	648	670	446	603	562	1,440	1,500	661	1,080	400
26	672	1,010	590	495	442	613	462	1,430	1,520	699	1,260	395
27	1,090	1,000	735	498	441	599	454	1,610	1,300	656	1,350	390
28	1,600	990	823	494	458	590	473	1,680	882	684	1,360	386
29	1,510	987	830	497	478	598	499	1,710	816	718	1,330	385
30	1,460	981	825	452	---	601	499	1,680	1,210	802	1,320	385
31	1,290	---	950	433	---	853	---	1,650	---	849	1,300	---
<b>Total</b>	21,631	22,314	33,919	22,061	24,107	17,252	20,949	30,701	44,338	26,911	29,205	16,394
<b>Mean</b>	698	744	1,094	712	831	557	698	990	1,478	868	942	546
<b>Max</b>	1,600	1,170	2,310	1,130	1,710	853	1,430	1,790	1,830	1,520	1,360	1,290
<b>Min</b>	317	386	544	433	439	438	454	402	816	462	672	330
<b>Ac-ft</b>	42,910	44,260	67,280	43,760	47,820	34,220	41,550	60,900	87,940	53,380	57,930	32,520

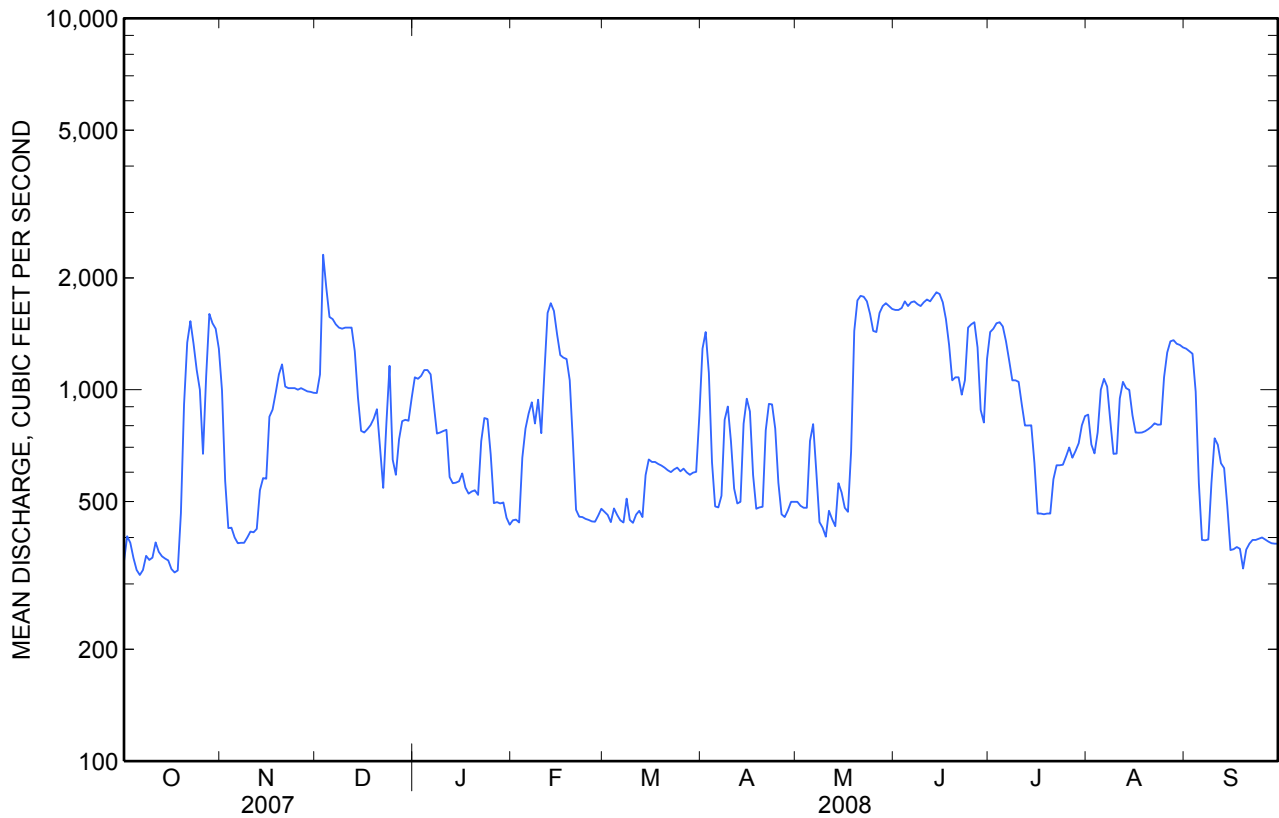
## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 2008, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	620	1,287	1,061	1,041	889	751	724	740	728	431	300	353
<b>Max</b>	1,630	3,080	1,787	1,766	1,586	1,548	1,284	1,257	1,478	925	942	635
<b>(WY)</b>	(1998)	(1991)	(1996)	(1999)	(1996)	(2007)	(1988)	(1984)	(2008)	(1997)	(2008)	(1995)
<b>Min</b>	227	246	261	396	310	335	276	305	256	198	167	203
<b>(WY)</b>	(1984)	(1988)	(1986)	(2001)	(1985)	(2001)	(1992)	(1995)	(1992)	(1987)	(1985)	(1985)

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SUMMARY STATISTICS

	Calendar Year 2007		Water Year 2008		Water Years 1984 - 2008	
Annual total	294,120		309,782			
Annual mean	806		846		742	
Highest annual mean					1,065	1997
Lowest annual mean					464	2001
Highest daily mean	4,870	Mar 25	2,310	Dec 3	20,100	Nov 24, 1990
Lowest daily mean	207	Jul 20	317	Oct 6	157	Aug 24, 1985
Annual seven-day minimum	315	Sep 24	340	Oct 4	157	Aug 23, 1985
Annual runoff (ac-ft)	583,400		614,500		537,800	
10 percent exceeds	1,600		1,520		1,560	
50 percent exceeds	569		765		516	
90 percent exceeds	335		395		223	



**12138160 SULTAN RIVER BELOW POWERPLANT, NEAR SULTAN, WA—Continued****WATER-QUALITY RECORDS**

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: June 1984 to current year.

INSTRUMENTATION.--Temperature recorder since June 1984, with 15-minute logging interval from 1993 to June 29, 2007 and 1 hour logging interval since June 29, 2007

REMARKS.--Records are excellent.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 17.5°C (rounded), Sept. 5-7, 1986; minimum, 1.0°C (rounded), Feb. 2-5, 1989.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 12.7°C, Aug. 18, but may have been higher during period of missing record; minimum, 2.0°C, Jan. 22.

**TEMPERATURE, WATER, DEGREES CELSIUS  
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008**

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
October			November			December			January			
1	12.0	10.5	11.1	8.4	8.2	8.3	5.7	5.3	5.5	3.6	3.0	3.3
2	11.0	10.0	10.3	8.2	7.7	7.9	5.4	5.1	5.3	3.2	3.1	3.2
3	10.0	9.1	9.5	8.2	7.9	8.1	6.3	4.3	5.3	3.4	3.2	3.2
4	9.9	9.0	9.4	8.3	8.0	8.2	6.5	6.0	6.3	3.5	3.3	3.4
5	9.7	9.2	9.5	8.0	7.7	7.9	6.0	5.6	5.8	3.5	3.3	3.4
6	9.9	9.4	9.6	8.0	7.7	7.9	5.6	5.4	5.5	3.3	3.0	3.2
7	10.0	9.5	9.8	8.2	8.0	8.1	5.5	5.3	5.4	3.0	2.9	2.9
8	9.6	8.9	9.2	8.5	8.2	8.4	5.3	5.1	5.2	2.9	2.7	2.8
9	10.7	9.5	10.1	8.5	8.2	8.4	5.1	5.0	5.0	2.9	2.7	2.8
10	10.6	9.7	10.2	8.4	7.9	8.1	5.1	5.0	5.1	3.1	2.8	2.9
11	10.0	9.5	9.8	8.1	7.9	8.1	5.0	4.9	5.0	3.7	3.0	3.4
12	10.0	9.5	9.8	8.0	7.5	7.9	5.0	5.0	5.0	3.7	3.5	3.6
13	9.7	9.1	9.4	7.7	7.2	7.4	5.0	4.8	4.9	3.7	3.4	3.5
14	9.8	9.0	9.5	7.5	7.1	7.3	4.8	4.7	4.8	3.4	2.9	3.2
15	9.7	9.6	9.7	7.5	7.3	7.4	4.8	4.7	4.8	3.2	2.8	3.0
16	9.7	9.4	9.6	7.7	7.4	7.6	4.9	4.8	4.8	3.2	3.0	3.1
17	9.5	9.2	9.3	7.6	7.3	7.5	4.9	4.3	4.6	3.1	2.9	3.0
18	9.5	9.0	9.2	7.4	7.2	7.2	4.6	4.3	4.4	3.0	2.8	2.9
19	9.6	8.5	9.1	7.2	7.0	7.1	4.8	4.6	4.7	2.9	2.6	2.7
20	8.9	7.7	8.4	7.0	6.8	6.9	4.9	3.9	4.4	3.0	2.6	2.8
21	9.1	7.8	8.7	6.8	6.6	6.6	4.2	3.9	4.1	2.7	2.2	2.4
22	9.3	9.1	9.2	6.6	6.3	6.4	4.4	4.2	4.3	2.3	2.0	2.2
23	9.4	9.2	9.3	6.3	6.2	6.2	4.7	4.3	4.4	2.4	2.2	2.3
24	9.3	8.6	9.0	6.3	6.1	6.2	4.8	4.3	4.6	2.4	2.3	2.3
25	8.9	8.6	8.7	6.3	6.2	6.3	4.7	4.0	4.5	2.3	2.2	2.2
26	8.6	7.9	8.3	6.2	6.0	6.1	4.0	3.0	3.4	2.5	2.1	2.3
27	8.8	7.5	8.2	6.1	5.8	6.0	3.9	3.3	3.7	2.7	2.5	2.6
28	8.8	8.6	8.7	5.9	5.7	5.8	3.8	3.3	3.6	2.7	2.4	2.5
29	8.7	8.6	8.7	---	---	---	3.5	3.3	3.4	2.6	2.3	2.5
30	8.7	8.6	8.6	---	---	---	3.7	3.3	3.5	2.5	2.3	2.4
31	8.6	8.3	8.4	---	---	---	3.8	3.5	3.7	2.7	2.5	2.6
Month	12.0	7.5	9.3	---	---	---	6.5	3.0	4.7	3.7	2.0	2.9

## 12138160 SULTAN RIVER BELOW POWERPLANT, NEAR SULTAN, WA—Continued

**TEMPERATURE, WATER, DEGREES CELSIUS**  
**WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008**

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
	February			March			April			May		
1	2.7	2.5	2.6	4.2	3.7	4.1	3.1	2.7	2.9	---	---	---
2	2.7	2.3	2.5	3.9	3.5	3.7	3.3	2.8	3.0	---	---	---
3	2.8	2.5	2.7	3.8	3.4	3.5	3.6	2.9	3.2	---	---	---
4	2.7	2.5	2.6	3.4	2.8	3.2	3.8	3.1	3.5	---	---	---
5	2.6	2.5	2.6	3.6	2.9	3.3	4.1	3.5	3.8	---	---	---
6	2.6	2.5	2.5	4.0	2.9	3.5	4.2	3.8	4.0	---	---	---
7	2.7	2.5	2.6	4.1	3.6	3.9	4.1	3.8	3.9	---	---	---
8	3.2	2.6	2.8	4.4	3.6	4.0	4.0	3.3	3.5	---	---	---
9	3.5	2.8	3.1	4.3	3.6	4.0	3.9	3.2	3.5	---	---	---
10	3.9	3.4	3.7	4.5	4.0	4.2	4.6	3.5	4.0	---	---	---
11	3.8	3.1	3.3	4.5	4.1	4.4	4.9	3.9	4.5	---	---	---
12	3.2	2.8	3.0	4.2	3.5	3.9	5.8	4.1	4.9	---	---	---
13	2.9	2.6	2.7	4.1	3.7	3.9	5.7	4.8	5.2	---	---	---
14	2.9	2.6	2.7	3.9	3.5	3.7	5.2	3.7	4.1	---	---	---
15	2.9	2.6	2.8	3.9	3.7	3.8	3.7	3.5	3.6	---	---	---
16	3.0	2.8	2.9	3.8	3.6	3.8	---	---	---	---	---	---
17	2.8	2.6	2.7	3.7	3.5	3.5	---	---	---	---	---	---
18	2.8	2.5	2.6	3.9	3.5	3.7	---	---	---	---	---	---
19	2.8	2.5	2.6	3.9	3.4	3.6	---	---	---	---	---	---
20	3.6	2.6	3.1	3.9	3.6	3.7	---	---	---	---	---	---
21	3.6	3.0	3.3	3.7	3.4	3.5	---	---	---	---	---	---
22	3.8	3.1	3.5	3.8	3.0	3.4	---	---	---	---	---	---
23	3.9	3.4	3.6	3.8	3.5	3.6	---	---	---	---	---	---
24	3.8	3.1	3.5	4.0	3.3	3.7	---	---	---	---	---	---
25	3.9	3.5	3.7	3.6	3.1	3.3	---	---	---	---	---	---
26	3.8	3.3	3.6	3.5	3.2	3.4	---	---	---	---	---	---
27	3.9	3.4	3.7	3.4	3.1	3.2	---	---	---	---	---	---
28	4.4	3.7	4.1	3.1	2.7	3.0	---	---	---	---	---	---
29	4.3	3.7	4.1	3.2	2.2	2.8	---	---	---	---	---	---
30	---	---	---	2.8	2.2	2.5	---	---	---	---	---	---
31	---	---	---	3.0	2.6	2.8	---	---	---	---	---	---
Month	4.4	2.3	3.1	4.5	2.2	3.6	---	---	---	---	---	---

## 12138160 SULTAN RIVER BELOW POWERPLANT, NEAR SULTAN, WA—Continued

 TEMPERATURE, WATER, DEGREES CELSIUS  
 WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
	June			July			August			September		
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	9.8	8.9	9.3	---	---	---
3	---	---	---	---	---	---	9.8	8.8	9.3	---	---	---
4	---	---	---	---	---	---	10.6	9.1	9.8	---	---	---
5	---	---	---	---	---	---	10.5	9.5	10	---	---	---
6	---	---	---	---	---	---	10.6	9.8	10.1	---	---	---
7	---	---	---	---	---	---	10.7	9.7	10.2	---	---	---
8	---	---	---	---	---	---	11.2	9.7	10.3	---	---	---
9	---	---	---	---	---	---	11.3	9.5	10.3	---	---	---
10	---	---	---	---	---	---	10.8	9.9	10.3	---	---	---
11	---	---	---	---	---	---	10.8	10.1	10.5	---	---	---
12	---	---	---	---	---	---	11.4	10.2	10.8	---	---	---
13	---	---	---	---	---	---	11.6	10.4	11.0	---	---	---
14	---	---	---	---	---	---	11.8	10.7	11.3	---	---	---
15	---	---	---	---	---	---	11.8	10.9	11.4	---	---	---
16	---	---	---	---	---	---	12.1	11.3	11.6	---	---	---
17	---	---	---	---	---	---	12.2	11.2	11.8	---	---	---
18	---	---	---	---	---	---	12.7	11.2	11.9	---	---	---
19	---	---	---	---	---	---	12.5	11.4	11.9	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---
25	---	---	---	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
Month	---	---	---	---	---	---	---	---	---	---	---	---